

04645.1003

- 4 -

In the Claims:

1. (Currently Amended) An electrochemical cell, which comprises:

- a) a negative electrode;
- b) a positive electrode comprising an electrode active material selected from one of the group:
 - i) a first electrode active material having the general formula $SM_xV_2O_y$, wherein SM is a metal selected from Groups IB to VIIIB and VIII of the Periodic Table of Elements, and wherein x is about 0.30 to 2.0 and y is about 4.5 to 6.0 in the general formula; and
 - ii) a second electrode active material having the general formula $Cu_xAg_yV_2O_z$, wherein about 0.01 ≤ x ≤ 1.0, about 0.01 ≤ y ≤ 1.0 and about 5.01 ≤ z ≤ 6.5;
- c) wherein the positive electrode includes at least a halogenated polymeric material as a first binder and a polyimide as a second binder, the positive electrode characterized as having been formed by first mixing the electrode active material with the first binder and a polyamic acid precursor of the second binder to form an electrode active admixture that is then contacted to a current collector followed by curing at a temperature of at least about 140°C to convert the polyamic acid to the polyimide second binder and drive off water

04645.1003

- 5 -

resulting from the conversion of the polyamic acid to the polyimide; and

d) e) an electrolyte activating the negative and the positive electrodes, wherein at least one of the negative electrode and the positive electrode comprises at least a first binder consisting of a halogenated polymeric material and a second binder consisting of a polyimide and wherein the polyimide is not soluble in the electrolyte.

2. (Original) The electrochemical cell of claim 1 as either a primary or a secondary cell.

3. (Currently Amended) The electrochemical cell of claim 1 wherein the a halogen of the halogenated polymeric material is fluorine.

4. (Original) The electrochemical cell of claim 1 wherein the first binder is selected from the group consisting of polytetrafluoroethylene, modified polytetrafluoroethylene, polyhexafluoropropylene, tetrafluoroethylene-hexafluoropropylene copolymers, tetrafluoroethylene-perfluoroalkyl vinyl ether copolymers, polytrifluoroethylene, ethylene-tetrafluoroethylene copolymers, fluoroethylene-hydrocarbon vinyl ether copolymers, polychlorotrifluoroethylene, ethylene-chlorotrifluoroethylene copolymers, polyvinyl fluoride, polyvinylidene fluoride, vinylidene fluoride-hexafluoropropylene copolymers, fluorinated (meth)acrylate resins, 2-fluoroacrylate resins,

04645.1003

- 6 -

fluorinated epoxy resins, fluorinated epoxy (meth)acrylate resins, fluorinated polyether resins, fluorinated polyimide resins, fluorinated polyester resins, fluorinated polyamide resins, fluorinated polycarbonate resins, fluorinated polyformal resins, fluorinated polyketone resins, fluorinated polyazomethine resins, fluorinated polyazole resins, fluorinated polyallyloxysilane resins, vinylidene fluoride-hexafluoropropylene fluoroelastomer, vinylidene fluoride-tetrafluoroethylene fluoroelastomer, tetrafluoroethylene-perfluoroalkyl vinyl ether fluoroelastomer, vinylidene fluoride-tetrafluoroethylenehexafluoropropylene fluoroelastomer, vinylidene fluoride-tetrafluoroethylene-perfluoroalkyl vinyl ether fluoroelastomer, tetrafluoroethylene-perfluoroalkyl vinyl ether fluoroelastomer, propylene-tetrafluoroethylene fluoroelastomer, fluorosilicone rubber, fluorinated phosphazene rubber, fluorinated thermoplastic rubbers and flexible fluorocarbon resins, and mixtures thereof.

5. (Original) The electrochemical cell of claim 1 wherein the ratio of the first binder to the second binder is, by weight, about 1:99 to about 99:1.

6. (Currently Amended) The electrochemical cell of claim 1 wherein the ratio of the first binder to the second binder is, by weight, about 40:60 to about 60:40.

04645.1003

- 7 -

7. (Currently Amended) The electrochemical cell of claim 1 wherein the first binder is polyvinylidene fluoride and the second binder is polyimide as a product of the conversion of polyamic acid.

8. (Currently Amended) The electrochemical cell of claim 1 wherein the cell is a lithium ion cell having the positive electrode comprised of lithiated cathode material and wherein with the negative electrode is comprised of a carbonaceous material and the ratio of the first binder to the second binder in the negative electrode electrodes is, by weight, about 3:1.

9. (Canceled)

10. (Currently Amended) The electrochemical cell of claim 1 wherein the at least one of the negative electrode and the positive electrode having the first binder and the second binder is characterized as having been cured at a temperature of about 225°C to about 275°C for about 30 minutes to about 2 hours prior to being contacted by the electrolyte.

11. to 30. (Canceled)

31. (New) The electrochemical cell of claim 1 wherein electrode active material is silver vanadium oxide.

32. (New) The electrochemical cell of claim 1 wherein the electrode active admixture is press contacted to the current collector at a pressure of about 3 tons/cm².

04645.1003

- 8 -

33. (New) The electrochemical cell of claim 1 wherein at least one of the negative electrode and the positive electrode either comprises an alkali metal or the alkali metal is intercalatable into the electrode active material.

34. (New) The electrochemical cell of claim 1 wherein the polyimide is insoluble in the electrolyte.

35. (New) The electrochemical cell of claim 1 wherein the electrolyte comprises an inorganic salt dissolved in at least one aprotic organic solvent.

36. (New) The electrochemical cell of claim 35 wherein the electrolyte comprises a low viscosity solvent selected from the group consisting of an ester, an ether, a dialkyl carbonate, and mixtures thereof, and a high permittivity solvent selected from the group consisting of a cyclic carbonate, a cyclic ester, a cyclic amide, and mixtures thereof.

04645.1003

- 9 -

37. (New) The electrochemical cell of claim 36 wherein the low viscosity solvent is selected from the group consisting of tetrahydrofuran, methyl acetate, diglyme, triglyme, tetraglyme, dimethyl carbonate, diethyl carbonate, dipropyl carbonate, methyl ethyl carbonate, methyl propyl carbonate, ethyl propyl carbonate, 1,2-dimethoxyethane, and mixtures thereof, and the high permittivity solvent is selected from the group consisting of propylene carbonate, ethylene carbonate, butylene carbonate, acetonitrile, dimethyl sulfoxide, dimethyl formamide, dimethyl acetamide, γ -butyrolactone, γ -valerolactone, N-methyl-pyrrolidinone, and mixtures thereof.

38. (New) The electrochemical cell of claim 35 wherein the inorganic salt is selected from the group consisting of LiPF₆, LiBF₄, LiAsF₆, LiSbF₆, LiClO₄, LiAlCl₄, LiGaCl₄, LiC(SO₂CF₃)₃, LiO₂, LiNO₃, LiO₂CCF₃, LiN(SO₂CF₃)₂, LiSCN, LiO₃SCF₂CF₃, LiC₆F₅SO₃, LiO₂CF₃, LiSO₃F, LiB(C₆H₅)₄, LiCF₃SO₃, and mixtures thereof.

04645.1003

- 10 -

39. (New) An electrode for an electrochemical cell, the electrode comprising:

- a) an electrode active material selected from one of the group:
 - i) a first electrode active material having the general formula $SM_xV_2O_y$, wherein SM is a metal selected from Groups IB to VIIIB and VIII of the Periodic Table of Elements, and wherein x is about 0.30 to 2.0 and y is about 4.5 to 6.0 in the general formula; and
 - ii) a second electrode active material having the general formula $Cu_xAg_yV_2O_z$, wherein about $0.01 \leq x \leq 1.0$, about $0.01 \leq y \leq 1.0$ and about $5.01 \leq z \leq 6.5$;
- b) a halogenated polymeric material as a first binder; and
- c) a polyimide as a second binder, the electrode characterized as having been formed by first mixing the electrode active material with the first binder and a polyamic acid precursor of the second binder to form an electrode active admixture that is then press contacted to a current collector followed by curing at a temperature of at least about $140^{\circ}C$ to convert the polyamic acid to the polyimide second binder and drive off water resulting from the conversion of the polyamic acid to the polyimide.

40. (New) The electrode of claim 39 wherein a halogen of the halogenated polymeric material is fluorine.

04645.1003

- 11 -

41. (New) The electrode of claim 39 wherein the first binder is selected from the groups consisting of polytetrafluoroethylene, modified polytetrafluoroethylene, polyhexafluoropropylene, tetrafluoroethylene-hexafluoropropylene copolymers, tetrafluoroethylene-perfluoroalkyl vinyl ether copolymers, polytrifluoroethylene, ethylene-tetrafluoroethylene copolymers, fluoroethylene-hydrocarbon vinyl ether copolymers, polychlorotrifluoroethylene, ethylene-chlorotrifluoroethylene copolymers, polyvinyl fluoride, polyvinylidene fluoride, vinylidene fluoride-hexafluoropropylene copolymers, fluorinated (meth)acrylate resins, 2-fluoroacrylate resins, fluorinated epoxy resins, fluorinated epoxy (meth)acrylate resins, fluorinated polyether resins, fluorinated polyimide resins, fluorinated polyester resins, fluorinated polyamide resins, fluorinated polycarbonate resins, fluorinated polyformal resins, fluorinated polyketone resins, fluorinated polyazomethine resins, fluorinated polyazole resins, fluorinated polyallyloxysilane resins, vinylidene fluoride-hexafluoropropylene fluoroelastomer, vinylidene fluoride-tetrafluoroethylene fluoroelastomer, tetrafluoroethylene-perfluoroalkyl vinyl ether fluoroelastomer, vinylidene fluoride-tetrafluoroethylenehexafluoropropylene fluoroelastomer, vinylidene fluoride-tetrafluoroethylene-perfluoroalkyl vinyl ether fluoroelastomer, tetrafluoroethylene-perfluoroalkyl vinyl ether fluoroelastomer, propylene-tetrafluoroethylene fluoroelastomer, fluorosilicone rubber, fluorinated

04645.1003

- 12 -

phosphazene rubber, fluorinated thermoplastic rubbers and flexible fluorocarbon resins, and mixtures thereof.

42. (New) The electrode of claim 39 wherein the ratio of the first binder to the second binder is, by weight, about 1:99 to 99:1.

43. (New) The electrode of claim 39 wherein the ratio of the first binder to the second binder is, by weight, about 40:60 to about 60:40.

44. (New) The electrode of claim 39 wherein the first binder is polyvinylidene fluoride.

45. (New) The electrode of claim 39 wherein the ratio of the first binder to the second binder is, by weight, about 50:50.

46. (New) The electrode of claim 39 characterized as having been cured at a temperature of about 225°C to about 275°C for about 30 minutes to about 2 hours.

47. (New) The electrode of claim 39 wherein the electrode active admixture comprises silver vanadium oxide press contacted to the current collector at a pressure of about 3 tons/cm².